THAT WHICH IS CLAIMED:

1. A descaling apparatus for the continuous descaling of an advancing metal surface without the use of caustic materials, said apparatus comprising:

a supply of media under a fluid pressure;

a blast head having at least one blast nozzle in fluid communication with said supply of media, said blast nozzle positioned in proximity to the advancing metal surface and spraying said media onto at least one portion of the advancing metal surface; and

an abrading device abrading the portion of the metal surface sprayed with media by the blast nozzle, said abrading device and blast head cooperating to descale said at least one portion of the advancing metal surface.

2. The descaling apparatus of claim 1, wherein said supply of media is a supply of nonmetallic media.

3. The descaling apparatus of claim 2, wherein said nonmetallic media have smooth edges.

4. The descaling apparatus of claim 3, said nonmetallic media with smooth edges comprising a plurality of ceramic beads.

5. The descaling apparatus of claim 4, wherein said ceramic beads have a mean particle diameter within a range of .025 mm to 1 mm.

6. The descaling apparatus of claim 4, wherein said ceramic beads have a mean particle diameter within a range of .07 mm to .14 mm.

7. The descaling apparatus of claim 3, said nonmetallic media with smooth edges comprising a plurality of glass beads.

8. The descaling apparatus of claim 1, further comprising at least one hose for supplying the fluid pressure and media to said at least one nozzle.

9. The descaling apparatus of claim 1, said abrading device comprising at least one brush for abrading the at least one portion of the metal surface.

10. The descaling apparatus of claim 9, said brush having a plurality of radially extending metal bristles.

11. The descaling apparatus of claim 10, wherein said metal bristles are stainless steel bristles with a tip diameter of .1 mm to .5 mm.

12. The descaling apparatus of claim 1, wherein said at least one nozzle is positioned approximately 3 inches to 12 inches from the metal surface.

13. The descaling apparatus of claim 1, wherein said at least one nozzle comprises a plurality of nozzles.

14. The descaling apparatus of claim 13, wherein said plurality of nozzles are fan shaped nozzles each spraying a fan shaped jet of said media.

15. The descaling apparatus of claim 14, wherein said fan shaped jets are overlapping and spray an entire width of the advancing metal surface.

16. The descaling apparatus of claim 14, wherein said plurality of fan shaped nozzles having a ceramic inner coating.

17. The descaling apparatus of claim 13, wherein said plurality of nozzles are arranged in rows.

18. The descaling apparatus of claim 17, wherein said plurality of nozzles are fan shaped nozzles spraying fan shaped jets of media that overlap to cover an entire width of the advancing metal surface.

19. The descaling apparatus of claim 1, wherein said metal surface is a substantially continuous metal surface.

20. The descaling apparatus of claim 19, wherein said substantially continuous metal surface comprises any one of a group of metal surfaces consisting of strip, sheet, bar, wire and rod stock.

21. The descaling apparatus of claim 1, wherein said metal surface comprises any one of a group of metals consisting of carbon steel, chromium alloyed steel, ferritic stainless steel, austenitic stainless steel, martensitic stainless steel, titanium, copper, brass and nickel.

22. The descaling apparatus of claim 13, wherein the nozzles of the blast head are down-firing nozzles and said at least one portion is a top portion of the advancing metal surface.

23. The descaling apparatus of claim 22, further comprising a second blast head having a plurality of up-firing nozzles spraying media onto a bottom portion of the advancing metal surface.

24. The descaling apparatus of claim 23, further comprising a second abrading device abrading the bottom portion of the metal surface, said second abrading device and second blast head cooperating to descale said bottom portion of the continuous metal surface.

25. A descaling apparatus for the continuous descaling of an advancing metal surface without the use of caustic materials, said apparatus comprising:

a supply of nonmetallic media;

a blast head having at least one nozzle in communication with said supply of media, said nozzle positioned in proximity to the advancing metal surface and spraying said media onto at least one portion of the advancing metal surface; and

an abrading device abrading the portion of the metal surface sprayed with media by the nozzle, said abrading device and blast nozzle cooperating to descale said portion of the advancing metal surface.

26. The descaling apparatus of claim 25, wherein said nonmetallic media have smooth edges.

27. The descaling apparatus of claim 26, said nonmetallic media with smooth edges comprising a plurality of ceramic beads.

28. The descaling apparatus of claim 27, wherein said ceramic beads have a mean particle diameter within a range of .025 mm to 1 mm.

29 The descaling apparatus of claim 27, wherein said ceramic beads have a mean particle diameter within a range of .07 mm to .14 mm.

30. The descaling apparatus of claim 26, said nonmetallic media with smooth edges comprising a plurality of glass beads.

31. The descaling apparatus of claim 25, where said supply of nonmetallic media are under a fluid pressure.

32. The descaling apparatus of claim 31, further comprising at least one hose for supplying the fluid pressure and media to said at least one nozzle.

33. The descaling apparatus of claim 25, said abrading device comprising at least one brush for abrading the at least one portion of the metal surface.

34. The descaling apparatus of claim 33, said brush having a plurality of radially extending metal bristles.

35. The descaling apparatus of claim 34, wherein said metal bristles are stainless steel bristles with a tip diameter of .1 mm to .5 mm.

36. The descaling apparatus of claim 25, wherein said at least one nozzle is positioned approximately 3 inches to 12 inches from the metal surface.

37. The descaling apparatus of claim 25, wherein said at least one nozzle comprises a plurality of nozzles.

38. The descaling apparatus of claim 37, wherein said plurality of nozzles are fan shaped nozzles each spraying a fan shaped jet of said media.

39. The descaling apparatus of claim 38, wherein said fan shaped jets are overlapping and spray an entire width of the advancing metal surface.

40. The descaling apparatus of claim 37, said plurality of fan shaped nozzles each having a ceramic inner coating.

41. The descaling apparatus of claim 37, wherein said plurality of fan shaped nozzles are arranged in rows.

42. The descaling apparatus of claim 36, wherein said plurality of nozzles are fan shaped nozzles spraying fan shaped jets of media that overlap to cover an entire width of the advancing metal surface.

43. The descaling apparatus of claim 25, wherein said metal surface is a substantially continuous metal surface.

44. The descaling apparatus of claim 43, wherein said substantially continuous metal surface comprises any one of a group of metal surfaces consisting of strip, sheet, bar, wire and rod stock.

45. The descaling apparatus of claim 25, wherein said metal surface comprises any one of a group of metals consisting of carbon steel, chromium alloyed steel, ferritic stainless steel, austenitic stainless steel, martensitic stainless steel, titanium, copper, brass and nickel.

46. The descaling apparatus of claim 37, wherein the nozzles of the blast head are down-firing nozzles and said at least one portion is a top portion of the advancing metal surface.

47. The descaling apparatus of claim 46, further comprising a second blast head having a plurality of up-firing nozzles spraying media onto a bottom portion of the advancing metal surface.

48. The descaling apparatus of claim 47, further comprising a second abrading device abrading the bottom portion of the metal surface, said second abrading device and second blast head cooperating to descale said bottom portion of the continuous metal surface.

49. The descaling apparatus of claim 25, wherein said blast nozzle is a suction nozzle.

50. An apparatus for removing a layer of scale from advancing metal having top and bottom surfaces, the apparatus comprising:

a conveyor apparatus for advancing the metal along a predetermined path;

a pressure pot having a supply of nonmetallic media and distributing the media through a plurality of supply lines using a pressurized fluid;

a blast head having a plurality of down-firing blast nozzles, each of said blast nozzles coupled to one of the supply lines to receive fluid pressure and media therefrom, said blast head positioned in proximity to the predetermined path of the metal and using said fluid pressure to distribute said media in a down-firing spray, said down-firing spray of media cracking at least a portion of the layer of scale on the top surface of the metal;

a second blast head having a plurality of up-firing blast nozzles, each of said blast nozzles coupled to one of the supply lines to receive fluid pressure and media therefrom, said second blast head positioned in proximity to the predetermined path of the metal and using said fluid pressure to distribute said media in an up-firing spray, said up-firing spray of media cracking at least a portion of the layer of scale on the bottom surface of the metal; and

an abrading station having a plurality of brushes and positioned along the predetermined path of the metal downstream from the first and second blast heads, one of

said brushes abrading the portion of the layer of scale on the top surface to form a descaled top surface and a second one of said brushes abrading the portion of the layer of scale on the bottom surface to form a descaled bottom surface.

51. A blast head for loosening scale on a metal surface using smooth edged media, said blast head comprising:

a chamber defining an inlet and an outlet, said inlet sized for the metal surface to pass therethrough into the chamber and said outlet sized and positioned relative to the inlet for the metal surface to pass therethrough and out of the chamber;

a supply of smooth edged media under a fluid pressure;

at least one nozzle having an inlet and a fan shaped outlet, said inlet in fluid communication with the supply of media and said fan shaped outlet positioned in the chamber and in proximity to the metal surface;

a deceleration zone positioned in the chamber and on an opposite side of the chamber from the fan shaped outlet; and

a media outflow zone positioned at a bottom of the chamber;

whereby said smooth edged media is propelled by the fluid pressure through the nozzle and out of the fan shaped outlet in a fan shaped spray onto the metal surface such that the spray loosens the scale on the metal surface, said deceleration zone decelerates any errant media missing the metal surface to limit damage to the blast head, and said media outflow zone captures falling media.

52. The blast head of claim 51, wherein the blast head further comprises a recycle line for recycling said media from the media outflow zone to a recovery apparatus, said recovery apparatus communicating with said supply of media.

53. The blast head of claim 51, wherein said fan shaped nozzle has a ceramic inner coating resistant to wear from the media.

54. The blast head of claim 51, wherein said deceleration zone has a depth of ½ foot to 10 feet.

55. The blast head of claim 51, further comprising at least one hose connected to the at least one nozzle and supplying pressurized fluid mixed with the media.

56. The blast head of claim 51, wherein said at least one nozzle comprises a plurality of nozzles.

57. The blast head of claim 56, wherein said plurality of nozzles are arranged in rows.

58. The blast head of claim 57, wherein each successive row of nozzles are supplied with media of progressively smaller mean particle diameters.

59. The blast head of claim 51, wherein said chamber further includes a resilient lining positioned to protect the blast head from the spraying and ricocheting media.

60. The blast head of claim 59, wherein said resilient lining is a urethane lining.

61. The blast head of claim 52, said chamber further including an air inlet plate defining a main aperture adjacent to the metal surface and a suction pressure applied through the aperture by said recycle line and drawing air across the metal surface such that dust, scale and media are cleared from the metal surface.

62. The blast head of claim 61, wherein said air inlet plate further defines a pair of side apertures adjacent to the inlet and outlet of the chamber and the suction pressure drawing air across the inlet and outlet such that dust, scale and media are cleared away from the inlet and outlet.

63. A continuous method of descaling a layer of scale on an advancing metal surface without the use of caustic materials, said method comprising:

advancing a metal surface along a predetermined path of travel;

cracking the layer of scale by spraying media under fluid pressure at the surface of advancing metal; and

abrading the cracked layer of scale to remove the scale thereby forming a descaled metal surface.

64. The method of descaling of claim 63, wherein said abrading step comprises abrading the metal surface to produce a metal surface having a roughness of less than 2.5 microns Ra.

65. The method of descaling of claim 63, wherein said abrading step comprises abrading the metal surface to produce a metal surface having a roughness of less than 1.5 microns Ra.

66. The method of descaling of claim 63, wherein said advancing step advances the metal surface at a speed of at least 100 feet per minute.

67. The method of descaling of claim 63, wherein said advancing step advances the metal surface at a speed of at least 400 feet per minute.

68. The method of descaling of claim 63, wherein said cracking step comprises spraying smooth edged media at the metal surface.

69. The method of descaling of claim 63, wherein said cracking step comprises spraying ceramic beads at the metal surface.

70. The method of descaling of claim 69, wherein said cracking step comprises spraying ceramic beads at the metal surface having a mean particle diameter within a range of .025 mm to 1 mm.

71. The method of descaling of claim 69, wherein said cracking step comprises spraying ceramic beads at the metal surface having a mean particle diameter within a range of .07 mm to .14 mm.

72. The method of descaling of claim 63, wherein said cracking step comprises spraying glass beads at the metal surface.

73. The method of descaling of claim 63, wherein said abrading step comprises brushing the metal surface.

74. The method of descaling of claim 63, wherein said cracking step comprises spraying a fan shaped jet of said media.

75. The method of descaling of claim 74, wherein said cracking step comprises spraying said media across an entire width of the advancing metal surface.

76. The method of descaling of claim 63, wherein said advancing step comprises advancing a substantially continuous metal surface along a predetermined path of travel.

77. The method of descaling of claim 76, wherein said advancing step comprises advancing any one of a group of metal surfaces consisting of strip, sheet, bar, wire and rod stock.

78. The method of descaling of claim 63, wherein said advancing step comprises advancing a metal surface comprising any one of a group of metals consisting

of carbon steel, chromium alloyed steel, ferritic stainless steel, austenitic stainless steel, martensitic stainless steel, titanium, copper, brass and nickel.

79. The method of descaling of claim 63, wherein said cracking step comprises down-firing said media at a top surface of the metal.

80. The method of descaling of claim 63, wherein said cracking step comprises additionally up-firing said media at a bottom surface of the metal.

81. The method of descaling of claim 63, wherein said cracking step comprises up-firing said media at a bottom surface of the metal.

82. The method of descaling of claim 63, wherein said cracking step comprises spraying media at a top and a bottom surface of said metal.

83. The method of descaling of claim 63, wherein said abrading step comprises abrading said top surface and said bottom surface of said metal.

84. The method of descaling of claim 63, further comprising the step of recycling the media from said cracking step.

85. Descaled metal produced by the method of claim 63, having a surface roughness of less than 2.5 microns.

86. Descaled metal produced by the method of claim 63, having a surface roughness of less than 1.5 microns.

87. Descaled metal produced by the method of claim 63, having SEM/EDS percent residual surface oxygen measurement of less than 4%

88. Descaled metal produced by the method of claim 63, having a residual surface particle content of from 0.1% to 1%.

89. Descaled metal produced by the method of claim 63, having a surface pH of 7 or above.

90. Descaled metal produced by the method of claim 63, said metal selected from one of a group consisting of hot rolled stainless steel, hot rolled carbon steel, low carbon steel, ferritic stainless steel, austenitic stainless steel, martensitic stainless steel, titanium, copper, nickel and brass.

91. Descaled metal produced by the method of claim 63, said metal selected from any one of a group of metal surfaces consisting of strip, sheet, bar, wire and rod stock.